12^{th} South African Regional ACM Collegiate Programming Contest

Sponsored by IBM

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Problem C - White Balloon
Suspension bridge

Problem Description

You are designing a tutorial program to help teach students the basics of civil engineering. One of the modules in your program deals with cable parameters of suspended deck bridges. For such a bridge, it is known that a parabola describes the shape of the cable span between the two main towers, provided that the deck is supported by vertical cables hanging from the main cable, and that the weight of the main cable is negligible compared to the weight of the deck (see Figure 1). In your tutorial program the student will have a cable of a specified length, and must adjust the other parameters of the bridge to complete the design.

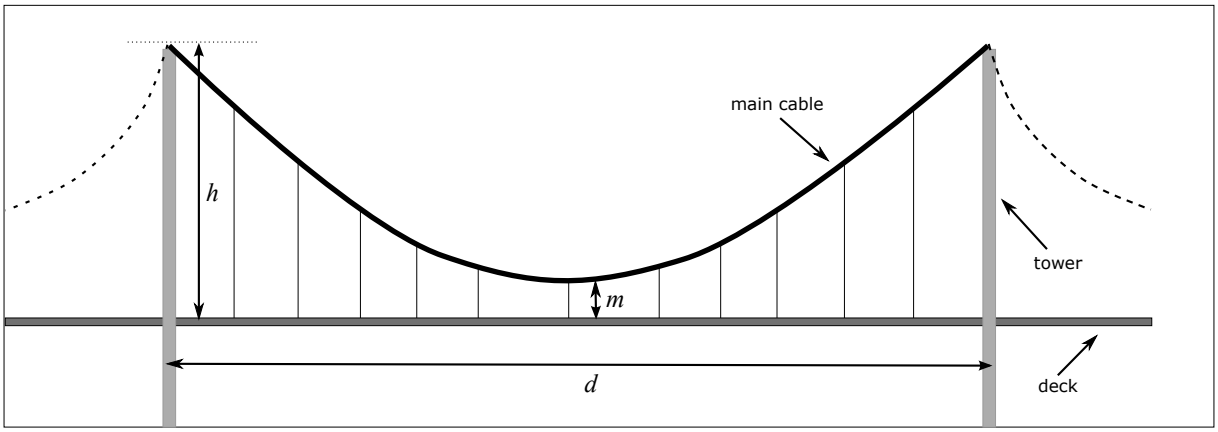

Figure 1: Diagram of a suspended deck bridge

Let l denote the length of the main cable in the central span, i.e, the piece of cable between the two towers — the rest of the cable does not concern us at the moment. Three parameters influence the value of l, namely the tower height above the deck (h), the horizontal distance between the endpoints of the cable (d), and the height above the deck of the lowest point of the cable (m).

Your program must calculate the value of m, given the parameters l, d, and h. You may assume that

the shape of the cable is a perfect parabola of the form $y = ax^2 + bx + c$, and that the parameters of this parabola are fully determined by the parameters m, h and d.

Input

Your input will consist of an arbitrary number of records adhering to the following format:

$h \quad d \quad l$

where h denotes the height-above-deck, d denotes the horizontal distance between the endpoints of the cable and l denotes the length of the cable. You may assume the following constraints: $1 \leq h \leq 160$, $1 \leq d \leq 2000$, and $1 \leq l \leq 2500$. The three parameters h, d and l will be given with an accuracy of 6 decimal digits after the radix point.

The end of input is indicated by a line containing only the value "-1" (equivalent to $h = -1$).

Output

For each input record, print out the line

m

where m denotes the minimum height of the cable above the deck (Figure 1). The value of m must be printed accurate to three decimal digits after the radix point. All the test data is such that $m \geq 0.001$.

Sample Input

```
15.000000 80.000000 80.093869
15.000000 100.000000 100.662723
-1
```

Sample Output

```
13.321
10.000
```

Time Limit

60 seconds